

HYDROGEOLOGIC SETTINGS OF EARTHEN WASTE STORAGE STRUCTURES ASSOCIATED WITH CONFINED ANIMAL FEEDING OPERATIONS IN IOWA

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Abstract

Thirty-four permitted earthen waste storage structures (EWSS) were investigated to characterize their hydrogeologic setting using digital soils data, digital elevation data, and oblique aerial photographs. Nearly 18 % of the sites were constructed over alluvial aquifers and flood plains. More than half the area within 2 miles of most sites had soils with a saturated permeability ≥ 1 in/hr and well or moderately to well-drained soils. The dominance of EWSS depths exceeding 10 ft and areas with water tables less than 5 ft deep, suggests that most sites are below the water table. Ephemeral or perennial streams were found within 500 ft at one-third of the sites. Reduced risks to water resources may be attained by using siting criteria that incorporate geologic, hydrogeologic, and soils data. Controlling the timing of manure application and avoiding application on frequently flooded and permeable soils may reduce the risk of water-resource contamination. Application of well-established, scientifically defensible groundwater monitoring techniques should be used to locate the position of the water table during construction and throughout the EWSS. Uniform stream setbacks may not be appropriate for all hydrogeologic settings. These considerations, used with appropriate performance standards, would reduce the potential for contamination of water resources.

Key words: hydrogeology, manure, soils, aquifers, streams